L26 ANSWER 35 OF 53 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1992:562338 HCAPLUS
TI Electric-field-effect transistor having indium gallium arsenide channel layer
IN Ando, Juji
PA NEC Corp., Japan

PI	JP 04162539	A2	19920608	JP 1990-288811	19901025
	US 5371387	A	19941206	US 1994-176513	19940103
PRAI	JP 1990-288811		19901025		
	US 1991-782625		19911025		

AB In the transistor consisting of a semiinsulative semiconductor substrate coated with a buffer layer, a nondoped channel layer, and a n-type electron-supplying layer, the channel layer consists of an InxGa1-xAs layer in which the In concentration ratio changes in the thickness direction and has a **maximum** at a 40-110-Å part from the interface with the electron-supplying layer.
IC ICM H01L021-338
ICS H01L029-812
IT Transistors
(field-effect, having indium gallium arsenide **channel** layer, with indium concentration **gradient**)
IT **106070-25-1**, Gallium indium arsenide ((Ga,In)As)
RL: USES (Uses)
(FET channel layer, indium-concentration-controlled)

Cited on PTO-1449

L26 ANSWER 16 OF 53 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1997:296137 HCAPLUS
TI An i-InGaP/n-InxGa1-xAs/i-GaAs step-compositioned doped-channel field-effect transistor (SCDCFET)
AU Liu, Wen-Chau; Laih, Lih-Wen; Cheng, Shiou-Ying; Wang, Wei-Chou; Lin, Po-Hung; Chen, Jing-Yuh; Lin, Wei
SO Proceedings - Electrochemical Society (1997), 97-1(Twenty-Sixth State-of-the-Art Program on Compound Semiconductors, 1997), 305-310
CODEN: PESODO; ISSN: 0161-6374
AB A new i-In0.49Ga0.51P/n-InxGa1-xAs/i-GaAs step-compositioned doped-channel field-effect transistor (SCDCFET) has been fabricated and studied. Due to the presence of **V-shaped** energy band formed by the step-**compositioned** doped-**channel** structure, a **large** c.d., a large gate voltage swing with high average transconductance and a high breakdown voltage are obtained. For a 1+80 μm2 gate dimension, a **maximum** drain saturation current of 830 mA/mm, a **maximum** transconductance of 188 mS/mm, a high gate breakdown voltage of 34 V and a large gate voltage swing of 3.3 V with transconductance > 150 mS/mm are achieved. These performances show that the studied device has a good potentiality for high-speed, high-power, and large input signal circuit applications.
IT **1303-00-0**, Gallium arsenide, uses **106070-25-1**, Indium gallium arsenide 106312-00-9, Indium gallium phosphide
RL: DEV (Device component use); USES (Uses)
(i-InGaP/n-InxGa1-xAs/i-GaAs step-compositioned doped-channel field-effect transistor)

L26 ANSWER 18 OF 53 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1997:283644 HCAPLUS
TI Field-effect transistors having an InGaAs channel layer and fabrication thereof for high-frequency waves
IN Unosawa, Hirokyo
PA Nippon Electric Co, Japan
PI JP 09064062 A2 19970307 JP 1995-211839 19950821
JP 2730524 B2 19980325
PRAI JP 1995-211839 19950821
AB The fabrication involves (1) forming a buffer layer on a GaAs substrate, (2) depositing a undoped 1st grated GaInP layer whose composition changes by continuously increasing the In concentration from Ga0.52In0.48P to Ga0.17In0.83P, (3) forming a Ga0.5In0.5As channel layer on the grated layer, (4) depositing an undoped 2nd grated GaInP layer whose composition changes by continuously decreasing the In concentration from Ga0.17In0.83P to Ga0.52In0.48P, (5) forming a cap layer over the 2nd grated layer, and (6) subsequently forming source/drain/gate electrodes on the cap layer. The **increased** In **concentration** in the **channel** layer gives the channel layer an increased electron mobility and increased sheet electron concentration
IC ICM H01L021-338
ICS H01L029-812; H01L021-20; H01L029-205

L26 ANSWER 21 OF 53 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1997:131632 HCAPLUS
TI **High**-performance InGaP/InGaAs/GaAs step-**compositioned** doped-**channel** field-effect transistor (SCDCFET)
AU Laih, Lih-Wen; Cheng, Shiou-Ying; Wang, Wei-Chou; Lin, Po-Hung; Chen, Jing-Yuh; Liu, Wen Chau; Lin, Wei
SO Electronics Letters (1997), 33(1), 98-99
CODEN: ELLEAK; ISSN: 0013-5194
AB A new i- In0.49Ga0.51P/InGaAs/i-GaAs step-compositioned doped-channel field-effect transistor (SCDCFET) has been fabricated and studied. Owing to the presence of a **V-shaped** energy band formed by the step-**compositioned** doped-**channel** structure, a **large** c.d., a large gate voltage swing with high average transconductance and a high breakdown voltage are obtained. For a 1 + 80μm2 gate dimension, a **maximum** drain saturation current of 830mA/mm, a **maximum** transconductance of 188mS/mm, a high gate breakdown voltage of 34V, and a large gate voltage swing of 3.3V with transconductance > 150mS/mm are achieved. These performances show that the studied device has a good potentiality for high-speed, high-power, and large input signal circuit applications.
IT Transconductance
(**high**-performance InGaP/InGaAs/GaAs step-**compositioned** doped-**channel** field-effect transistor (SCDCFET))
IT **1303-00-0**, Gallium arsenide, uses **106389-99-5**, Gallium indium arsenide (Ga0.85In0.15As) 106770-37-0, Gallium indium phosphide (Ga0.51In0.49P) **107498-92-0**, Gallium indium arsenide (Ga0.8In0.2As) **107498-93-1**, Gallium indium arsenide (Ga0.9In0.1As)
RL: DEV (Device component use); USES (Uses)
(**high**-performance InGaP/InGaAs/GaAs step-**compositioned** doped-**channel** field-effect transistor (SCDCFET))

L26 ANSWER 5 OF 53 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2000:368877 HCAPLUS
TI Study of Raman scattering on InP/InGaAs/InP HEMTs
AU Radhakrishnan, K.; Patrick, T. H. K.; Zheng, H. Q.; Yoon, S. F.
SO Materials Research Society Symposium Proceedings (2000), 588(Optical Microstructural Characterization of Semiconductors), 167-172
CODEN: MRSPDH; ISSN: 0272-9172
AB Raman scattering studies were recently used to relate the strain in the semiconductor layer structure with the line shape of allowed modes. It can yield important information about the nature of the solid on a scale of the order of a few lattice consts. It can also provide an evaluation on the carrier **concentration** in the **channel** layer of **high** electron mobility transistors (HEMTs). Raman scattering was used to study the effect of varying the In mole fraction (x) from 0.53 to 0.81 in the InxGa1-xAs channel layer of InGaAs/InP heterostructures. The effect of varying the doping concentration in the donor layer from 6 + 1017/cm3 to 2.5 + 1018/cm3, and the effect of varying the In0.75Ga0.25As channel thickness from 140 to 260 Å are reported. A 2-mode Raman characteristic for all InxGa1-xAs/InP HEMTs is clearly seen, with the 2 LO modes (InAs-like LO and GaAs-like LO) located at 229 and 268.6 cm-1, resp. At a Raman frequency of 347 cm-1, a small **peak** is observed due to InP LO mode. As the In composition increases from 0.53 to 0.81, the InAs-like LO mode **peak** intensity increases while that of GaAs-like LO mode decreases. The **peak** intensity ratio of InAs-like LO mode and GaAs-like LO mode increases from 0.78 to 1.10. By increasing the doping concentration in the donor layer (ND), there is also an **increase** in the carrier **concentration** in the InGaAs **channel** assuming that the donors are fully ionized. The coupled mode between the InGaAs longitudinal optical phonons and electrons in the InGaAs channel shifts continuously to a low wave number with the increasing ND in the InP donor layer. The increase in the InGaAs channel thickness from 140 to 260 Å causes the InAs-like LO mode **peak** to shift to a lower waveno. from 235.5 to 228.5 cm-1. There is no change in the GaAs-like LO **peak** position located at 268.4 cm-1.
IT **22398-80-7**, Indium phosphide, properties **106097-59-0**, Gallium indium arsenide (Ga0.47In0.53As) **109117-64-8**, Gallium indium arsenide (Ga0.33In0.67As) **111446-08-3**, Gallium indium arsenide (Ga0.25In0.75As) **114104-02-8**, Gallium indium arsenide (Ga0.37In0.63As) **118392-56-6**, Gallium indium arsenide (Ga0.19In0.81As)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(Raman spectra of high-electron-mobility transistors containing)

L26 ANSWER 6 OF 53 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2000:367490 HCAPLUS
TI Step-**graded** doped-**channel** (SGDC) field-effect transistor
AU Lin, K. W.; Liu, W. C.; Yu, K. H.; Cheng, C. C.; Thei, K. B.; Shih, H. J.
SO Proceedings - Electrochemical Society (2000), 2000-1(Compound Semiconductor Power Transistors II and State-of-the-Art Program on Compound Semiconductors (SOTAPOCS XXXII), 2000), 339-346
CODEN: PESODO; ISSN: 0161-6374
PB Electrochemical Society
AB An i-InGaP/n-InxGa1-xAs/i-GaAs step-**graded** doped-**channel** field-effect transistor (SGDCFET) was fabricated and studied. Due to the existence of **V-shaped** energy band formed by the step-graded structure, a large output c.d., a large gate voltage swing with high average transconductance and a high breakdown voltage can be expected. First, a theor. model and a transfer matrix technique are employed to analyze the energy states and wave functions in the step-graded quantum wells. Exptl., for a 1 + 80 μm2 gate dimension device, a **maximum** drain saturation c.d. of 830 mA/mm, a **maximum** transconductance of 188 mS/mm, a high gate breakdown voltage of 34 V, and a large gate voltage swing 3.3 V with transconductance >150 mS/mm are achieved. These performances show that the studied device has a good potentiality for high-speed, high-power, and large input signal circuit applications.
IT **1303-00-0**, Gallium arsenide, properties **106389-99-5**, Gallium indium arsenide (Ga0.85In0.15As) 106770-37-0, Gallium indium phosphide (Ga0.51In0.49P) **107498-92-0**, Gallium indium arsenide (Ga0.8In0.2As) **107498-93-1**, Gallium indium arsenide (Ga0.9In0.1As)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(electronic and elec. properties of i-InGaP/n-InxGa1-xAs/i-GaAs step-**graded** doped-**channel** field-effect transistor)

L26 ANSWER 8 OF 53 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2000:91209 HCAPLUS
TI 190-GHz InP HEMT MMIC LNA with dry etched backside vias
AU Barsky, M.; Lai, R.; Kok, Y. L.; Sholley, M.; Streit, D. C.; Block, T.; Liu, P. H.; Sabin, E.; Rogers, H.; Medvedev, V.; Gaier, T.; Samoska, L.
SO International Conference on Indium Phosphide and Related Materials, 11th, Davos, Switzerland, May 16-20, 1999 (1999), 423-425 Publisher: Institute of Electrical and Electronics Engineers, New York, N. Y.
CODEN: 68QKA4
AB The authors report on an InP HEMT MMIC LNA incorporating dry etched backside ground plane vias with an on-wafer measured **peak** gain of 9.6 dB at 190 GHz. The 2-stage balanced LNA exhibited over 7-dB gain across a 30-GHz bandwidth. The high gain and high operating frequency of the amplifier is attributed to the lower source inductance provided by the 25-μm dry etched ground vias, the 80-nm T-gate, and the **graded** In0.80Ga0.20As **channel** HEMT.
CC 76-14 (Electric Phenomena)
IT **22398-80-7**, Indium phosphide (InP), uses
RL: DEV (Device component use); USES (Uses)
(190-GHz InP HEMT MMIC LNA with dry etched backside vias)